



NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

AGENCY: National Aeronautics and Space Administration (NASA).

[NOTICE: (22-006)]

ACTION: Notice of Deep Space Food Challenge Phase 2.

SUMMARY: Phase 2 of the Deep Space Food Challenge is open, and teams that wish to compete may now register. NASA seeks to stimulate research and technology solutions to support future missions and inspire new national aerospace capabilities through public prize competitions called Centennial Challenges. The Deep Space Food Challenge is one such competition. Centennial Challenges are managed at NASA's Marshall Space Flight Center in Huntsville, Alabama and are part of the Prizes, Challenges, and Crowdsourcing program within NASA's Space Technology Mission Directorate at the agency's Headquarters in Washington. Phase 2 of the Deep Space Food Challenge is a prize competition with a total prize purse of \$1,000,000 USD, (one million United States dollars) to be awarded to Competitor Teams that build and successfully demonstrate prototypes of novel technologies, systems and approaches for food production for long duration space exploration missions. Teams are not required to have participated in Phase 1 and must meet eligibility requirements in order to participate. NASA is providing the prize purse for U.S. Teams, and the Methuselah Foundation will be conducting the Challenge on behalf of NASA. NASA is considering a Phase 3 (full system demonstration phase) of the competition depending on the outcome of the Phase 2 competition.

DATES: Challenge registration for Phase 2 opened January 20, 2022 and will remain open until February 28, 2022. No further requests for registration will be accepted after the stated deadline. Other important dates, including deadlines for key deliverables from the Teams, are listed on the Challenge website: deepspacefoodchallenge.org

ADDRESSES: Phase 2 of the Deep Space Food Challenge requires competitors to build and demonstrate their prototypes at their own facility. Required samples from the prototypes will be

sent to external laboratories for testing as described in the Official Rules document.

FOR FURTHER INFORMATION CONTACT: To register for or get additional information regarding the Deep Space Food Challenge, please visit: deepspacefoodchallenge.org

Questions and comments regarding the challenge should be addressed to Monsi Roman, Centennial Challenges Program Manager, NASA Marshall Space Flight Center Huntsville, AL 35812. Email address: hq-stmd-centennialchallenges@mail.nasa.gov. For general information on NASA prize competitions, challenges, and crowdsourcing opportunities, please visit: nasa.gov/solve.

For general information on the Canadian Space Agency please visit:

<https://www.canada.ca/en/space-agency.html> General questions and comments regarding the program should be addressed to ASC.DefiAEL-DSFChallenge.CSA@canada.ca

SUPPLEMENTARY INFORMATION:

Summary

Food is a critical component of human space exploration missions. When humans return to the lunar surface, the early missions are expected to use prepackaged foods similar to those in use on the International Space Station (ISS) today but extending the duration of lunar missions requires reducing resupply dependency on Earth. Thus, testing a sustainable system on the Moon that meets lunar crews' needs is a fundamental step for both lunar sustainability and will also support Mars exploration. As part of this, space agencies are focused on how to furnish crew members with a viable system that produces food for all long duration space missions. Solutions from the Deep Space Food Challenge could be part of the larger food system as an integrated solution that:

- Provides all daily nutritional needs
- Provides a variety of palatable and safe food choices
- Enables acceptable, safe, and quick preparation methods
- Limits resource requirements with no dependency on direct periodic resupply from Earth over durations increasing from months to years

In short, space agencies will need to provide their future crew members with nutritious foods they will enjoy eating within all of the constraints of current technology for life away from Earth. They must also ensure that the process to create, grow, and/or prepare the food is not time consuming and not unpleasant. Although there are many food systems on Earth that may offer benefits to space travelers, the ability of these systems to meet spaceflight demands has not yet been established.

Additionally, food insecurity is a significant chronic problem on Earth in urban, rural, and harsh environments and communities. In places like the Arctic and Canada's North, the cost of providing fresh produce on the shelves can be incredibly high. This can also support greater food production in other milder environments, including major urban centers where vertical farming, urban agriculture and other novel food production techniques can play a more significant role.

Disasters can also disrupt supply chains, on which all people depend, and further aggravate food shortages. Developing compact and innovative advanced food system solutions can further enhance local production and reduce food supply chain challenges, providing new solutions for humanitarian responses to floods and droughts, and new technologies for rapid deployment following disasters.

The Deep Space Food Challenge will identify technology solutions that can:

- Help fill food gaps for a crew of 4 for a three-year round-trip mission with no resupply
- Improve the accessibility of food on Earth, in particular, via production directly in urban centers and in remote and harsh environments
- Achieve maximum food output with minimal inputs and minimal waste
- Create a variety of palatable, nutritious, and safe foods that requires little processing time for crew members

This Challenge seeks to incentivize Teams to develop novel technologies, systems and/or approaches for food production that need not meet the full nutritional requirements of future crews but can contribute significantly to and be integrated into a comprehensive food system.

I. Prize Amounts

Phase 2 of the Deep Space Food Challenge has a total prize purse of \$1,000,000 USD, (one million United States dollars).

Up to 10 top scoring U.S. Teams will be named “finalists” and will receive \$20,000 USD each from NASA and will move on to compete in the final on-site demonstration.

After the final on-site demonstration up to 5 top scoring U.S. Teams will each be awarded \$150,000 USD each and be invited to compete in Phase 3 (should Phase 3 open for competition).

Additionally, a total of \$50,000 USD will be available for bonus prizes for up to 5 U.S. Teams to be awarded when finalists Teams are announced. U.S. Teams do not need to be named as a finalist in order to be awarded a bonus prize.

U.S. Teams must meet the eligibility requirements for the NASA Prize in order to receive a prize from NASA.

II. Eligibility to Participate and Win Prize Money

To be eligible to win a prize, competitors must register and comply with all requirements in the Official Rules. Interested Teams should refer to the official Challenge website (deepspacefoodchallenge.org) for full details on eligibility and registration.

III. Official Rules

The complete official rules for the Deep Space Food Challenge can be found at:

deepspacefoodchallenge.org

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